

## Exhibit 300: Capital Asset Summary

### Part I: Summary Information And Justification (All Capital Assets)

#### Section A: Overview & Summary Information

**Date Investment First Submitted:** 2010-03-19  
**Date of Last Change to Activities:** 2012-08-16  
**Investment Auto Submission Date:** 2012-02-28  
**Date of Last Investment Detail Update:** 2012-02-28  
**Date of Last Exhibit 300A Update:** 2012-08-16  
**Date of Last Revision:** 2012-08-16

**Agency:** 006 - Department of Commerce      **Bureau:** 48 - National Oceanic and Atmospheric Administration

**Investment Part Code:** 01

**Investment Category:** 00 - Agency Investments

**1. Name of this Investment:** NOAA/NWS/ Data Assimilation and Modeling

**2. Unique Investment Identifier (Ull):** 006-000311000

#### Section B: Investment Detail

- 1. Provide a brief summary of the investment, including a brief description of the related benefit to the mission delivery and management support areas, and the primary beneficiary(ies) of the investment. Include an explanation of any dependencies between this investment and other investments.**

Data Assimilation and Modeling (DAaM) are fundamental components of the Weather, Water, Ocean, Air Quality and Hydrological forecast mission performed by the National Centers for Environmental Prediction, National Weather Service, NOAA. DAaM software is executed on the NCEP Supercomputer for the operational provision of weather, ocean, air quality, hurricane and hydrological forecasts to NWS forecast offices and other users throughout the Nation. Continual maintenance, enhancement and augmentation of software capabilities (in response to user requirements) is essential to save lives and property and to enhance the Nation's economy that is sensitive to severe weather events (e.g. hurricanes) and short term climate (e.g. El Nino). A contract for scientific support services has existed since 1986 to the present as a supplement to Civil Service FTEs. The project has a Scientific Support Services Contract (SSSC) that was expanded in FY10 to incorporate additional DAaM requirements such as ecosystem and space weather modeling. The DA&M project supports scientific programming in the following scientific, mission-related areas: (1) mesoscale weather for North America and sub-regions; (2) global weather; (3) real-time ocean features including waves; (4) climate (out to 1 year); (5) hurricane track, intensity and related storm surge; (6) probabilistic prediction using ensembles; (7) air quality and environmental monitoring; (8) ecosystems; (9) land surface and hydrology, and (10) space weather.

**2. How does this investment close in part or in whole any identified performance gap in support of the mission delivery and management support areas? Include an assessment of the program impact if this investment isn't fully funded.**

The future well-being of society as a whole will require understanding, predicting, and responding to changing climate, weather, ocean and coastal conditions in ways that improve the long-term resilience of the total ecosystem. For NOAA, with its vision of resilience in the face of change, this will entail understanding the current conditions, projecting future changes, and helping stakeholders make decisions to reduce their sensitivity to, and cope with, major hazards and stresses that emerge over time. By improving our understanding of and ability to predict changes in the Earth's environment, NOAA generates tremendous value, allowing our nation to live prosperously and safely in a constantly changing and often threatening world through spurring the creation of new jobs and industries, working to sustain our fisheries within healthy and productive ecosystems, helping the nation understand and respond to the impacts of a changing climate, enabling businesses and communities to prepare for and respond to sudden, high-impact and/or prolonged weather events, and restoring natural environments and the species that inhabit them. NOAA's enduring mission to understand and predict changes in Earth's environment and conserve and manage coastal and marine resources to meet our nation's economic, social, and environmental needs is realized through its core science, service, and stewardship functions. Through science, service, and stewardship, NOAA will pursue four interrelated and mutually supportive long-term goals: climate adaptation and mitigation; a weather-ready nation; sustainable and resilient fisheries, habitats, and species; and sustainable coastal communities and economies. Guidance provided by numerical models is the very bedrock of the forecast process and supports all aspects of society. Forecasts based on numerical models keep people out of harm's way during hazardous events, as well as support transportation, resource management and energy production, agriculture and food security, homeland defense, national security, satellite communications, and financial markets, among others. The Data Assimilation and Modeling project is responsible for the maintenance, development, and transition of research into the NOAA operational environmental modeling suite. Decreased funding will force a reduction in scope of the operational numerical guidance system such that it will not be able to meet the needs identified within the NOAA NGSP.

**3. Provide a list of this investment's accomplishments in the prior year (PY), including projects or useful components/project segments completed, new functionality added, or operational efficiency achieved.**

Upgrades were made to the following NCEP Operational numerical guidance systems: Hurricane Wave W/Great Lakes Upgrade. Great Lakes Ocean Forecast System. NAEFS Downscaling for Alaska. Sea Surface Temperature Analysis. HYSPLIT - Added Capability to Cycle and Shift Plumes. Climate Forecast System Version 2. High Resolution Window System. NOS Ocean Forecast System for Chesapeake, Delaware and Tampa Bays. Hurricane Weather Research and Forecasting System. GFDL Hurricane model. Real-Time Global Sea Surface Temperature product. NOAA Operational Model Archive and Distribution System (NOMADS). Combine NCEP and Navy wave ensemble products 2.1.0. WSA-ENLIL Space Weather Model Parallel.

**4. Provide a list of planned accomplishments for current year (CY) and budget year (BY).**

Upgrades are planned for the following NCEP operational numerical guidance systems in FY12: Global RTOFS NRL Aircraft. Wave Model. Rapid Refresh. Combine NCEP MMAB and Navy (FNMOC) Wave Ensemble. Experimental Gridded MOS Guidance for the CONUS at 2.5km resolution (Parallel). EKDMOS. Wave Model. RTMA . NAEFS. GEFS. SREF. ESTOFS. Hurricane Wave - Great Lakes - Ensembles. Implement 12 km CMAQ CONUS, AK, HI Air quality upgrades. Northern Gulf of Mexico Operational Forecast System. Columbia River Estuary Operational Forecast System. Hybrid EnKF-3DVar Assimilation. HWRF Upgrade. Integrate Atlantic and Global Ocean Forecast Systems. Ice Concentration Analysis. WSA ENLIL (operational).

**5. Provide the date of the Charter establishing the required Integrated Program Team (IPT) for this investment. An IPT must always include, but is not limited to: a qualified fully-dedicated IT program manager, a contract specialist, an information technology specialist, a security specialist and a business process owner before OMB will approve this program investment budget. IT Program Manager, Business Process Owner and Contract Specialist must be Government Employees.**

2011-12-27

## Section C: Summary of Funding (Budget Authority for Capital Assets)

1.

Table I.C.1 Summary of Funding

	PY-1 & Prior	PY 2011	CY 2012	BY 2013
Planning Costs:	\$0.0	\$0.0	\$0.0	\$0.0
DME (Excluding Planning) Costs:	\$39.0	\$6.9	\$6.9	\$6.9
DME (Including Planning) Govt. FTEs:	\$47.0	\$7.2	\$7.2	\$7.2
Sub-Total DME (Including Govt. FTE):	\$86.0	\$14.1	\$14.1	\$14.1
O & M Costs:	\$36.6	\$7.4	\$7.4	\$7.4
O & M Govt. FTEs:	\$0.0	\$0.0	\$0.0	\$0.0
Sub-Total O & M Costs (Including Govt. FTE):	\$36.6	\$7.4	\$7.4	\$7.4
Total Cost (Including Govt. FTE):	\$122.6	\$21.5	\$21.5	\$21.5
Total Govt. FTE costs:	\$47.0	\$7.2	\$7.2	\$7.2
# of FTE rep by costs:	428	52	52	52
Total change from prior year final President's Budget (\$)		\$21.5	\$21.5	
Total change from prior year final President's Budget (%)		0.00%	0.00%	

2. If the funding levels have changed from the FY 2012 President's Budget request for PY or CY, briefly explain those changes:

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## Section D: Acquisition/Contract Strategy (All Capital Assets)

Table I.D.1 Contracts and Acquisition Strategy

Contract Type	EVM Required	Contracting Agency ID	Procurement Instrument Identifier (PIID)	Indefinite Delivery Vehicle (IDV) Reference ID	IDV Agency ID	Solicitation ID	Ultimate Contract Value (\$M)	Type	PBSA ?	Effective Date	Actual or Expected End Date
Awarded	1330	<a href="#">DOCDG133W-10CN0111</a>									
Awarded	1330	<a href="#">DOCDG133W-10-SE-2290</a>									

**2. If earned value is not required or will not be a contract requirement for any of the contracts or task orders above, explain why:**

The use of Earned Value Management techniques to monitor performance would be inappropriate for the described contracted effort planned in support of the development and maintenance of weather forecast models for the Environmental Modeling Center. The contractor will not be responsible to deliver a defined, discrete product; their deliverable will be labor hours dedicated to supporting NOAA scientists performing the same sort of work with separate and distinct responsibilities. Under this scenario, Earned Value Management techniques and the accompanying Earned Value Management System would be of no use, since the Planned Value, Earned Value, and Actual Cost metrics would, by definition, always be equal. Additionally, the establishment of the Planned Value metric and the measurement of Earned Value require the definition of a set of discrete deliverables through the use of a Work Breakdown Structure. Since there is no discrete deliverable to be delivered through this contracted effort, there cannot be a meaningful Work Breakdown Structure, thus the development of meaningful Earned Value Management metrics would be impossible.

## Exhibit 300B: Performance Measurement Report

### Section A: General Information

**Date of Last Change to Activities:** 2012-08-16

### Section B: Project Execution Data

**Table II.B.1 Projects**

Project ID	Project Name	Project Description	Project Start Date	Project Completion Date	Project Lifecycle Cost (\$M)
3110D11001	Develop New Models	The Data Assimilation and Modeling Project is tasked with upgrading existing and implementing new operational numerical guidance systems to meet NOAA environmental prediction requirements.			
3110M12001	Porting Software to New SuperComputer	The NCEP operational production suite of models must be transition from the IBM P6 to the yet to be defined new operational super computer.			

### Activity Summary

Roll-up of Information Provided in Lowest Level Child Activities

Project ID	Name	Total Cost of Project Activities (\$M)	End Point Schedule Variance (in days)	End Point Schedule Variance (%)	Cost Variance (\$M )	Cost Variance (%)	Total Planned Cost (\$M)	Count of Activities
3110D11001	Develop New Models							
3110M12001	Porting Software to New SuperComputer							

Key Deliverables								
Project Name	Activity Name	Description	Planned Completion Date	Projected Completion Date	Actual Completion Date	Duration (in days)	Schedule Variance (in days )	Schedule Variance (%)
3110D11001	Development of Wvae Model Upgrade	: Provide spectral output at higher resolution, consistent with internal model resolution. Minor bug fixes and code upgrades to make grid and point output consistent. Implement new directory structure for sharing MMAB/EMC code and scripts with PMB/NCO via svn server (TEST CASE FOR CCS Development/Producti on Environment Equivalence).	2011-10-16	2011-10-16	2011-10-16	45	0	0.00%
3110D11001	Development of NRL Aircraft Quality Control System	This is a replacement package (OPS_ACFTQC) EMC has adapted from the Navy to quality control aircraft observations which are continuous and can have a track-checker applied for improved quality control. This package is contingent on the NEWBUFRLIB upgrade.	2011-11-01	2011-11-01	2011-11-01	63	0	0.00%
3110D11001	Transition Global RTOFS	Transition the global real time ocean forecast system into NCEP operational production suite	2011-11-22	2011-11-22	2011-10-28	82	25	30.49%
3110D11001	Development and testing of Rapid Refresh system	RUC becomes Rapid Refresh, WRF-ARW replaces RUC model. RUC 3DVAR analysis replaced by use of NCEP's GSI	2011-12-01	2011-12-01	2011-12-01	122	0	0.00%



Key Deliverables								
Project Name	Activity Name	Description	Planned Completion Date	Projected Completion Date	Actual Completion Date	Duration (in days)	Schedule Variance (in days )	Schedule Variance (%)
		analysis. Domain is expanded to include Alaska						
3110D11001	Develop and test the combined NCEP MMAB and Navy (FNMOE) Wave Ensemble system	Adding 20 members of FNMOE wave ensemble to create combined NCEP/FNMOE wave ensemble. Expected Benefits: Improved mean ensemble product (from processing of off-line data). Possibly improved ensemble statistical information.	2011-12-27	2011-12-27	2011-12-27	87	0	0.00%
3110D11001	Transition combined NCEP MMAB and Navy (FNMOE) Wave Ensemble system	Transition of the combined wave ensemble system into the NCEP operational production suite	2011-12-27	2011-12-27	2011-12-27	87	0	0.00%
3110D11001	Transition of NRL Aircraft Quality Control System	Transition of the NRL aircraft quality control package into NCEP operational production suite	2011-12-31	2012-08-01		59	-244	-413.56%
3110D11001	Develop and test the Global Ensemble Forecast System	Upgrades include: 1. Increase Model Horizontal Resolution from T190 to T254 for 0-192 hours. 2. Increase Model Vertical Resolution from 28 levels to 42 levels for 0-384 hours. 3. Include 2011 GFS Physics package (V9.1.0) 4. Increase initial perturbation size for lower atmospheric levels. 5. Adjust Stochastic Total Tendency	2012-01-15	2012-01-15	2012-01-15	136	0	0.00%

Key Deliverables								
Project Name	Activity Name	Description	Planned Completion Date	Projected Completion Date	Actual Completion Date	Duration (in days)	Schedule Variance (in days )	Schedule Variance (%)
		Perturbation (STTP) 6. Adjust tropical storm initial perturbation intensity						
3110D11001	Transition Wvae Mode Upgrade	Transition upgraded wave model into NCEP operational production suite	2012-01-31	2012-05-08	2012-05-15	106	-105	-99.06%
3110D11001	Development of FY12 Global Hybrid Data Assimilation System	Expected Benefits: Significant improvement is the initial conditions for the Global Forecast System, resulting in significant improvements in model performance. Scope: 1. GPS RO bending angle rather than refractivity 2. Inclusion of compressibility factors for atmosphere 3. Retune SBUV ob errors 4. Inclusion of MLS real-time ozone data 5. Update radiance usage flags 6. Prepare for NPP and Metop-B 7. Add GOES-13 data 8. CRTM Rel 2.1 9. Add more IASI and AIRS moisture channels 10. Add Severi CSBT radiance product 11. Modification of Bias correction 12. Satellite monitoring stats code included in Ops. 13. Improved moisture analysis 14. New Sat wind data and QC 15. NSST analysis in GSI	2012-02-01	2012-02-01	2012-02-01	153	0	0.00%

Key Deliverables								
Project Name	Activity Name	Description	Planned Completion Date	Projected Completion Date	Actual Completion Date	Duration (in days)	Schedule Variance (in days )	Schedule Variance (%)
		and use in Coupled Model 16. Inclusion of clouds and PBL in strong constraint 17. EnKF hybrid system 18. Update to current version of trunk 19. Possible elimination of separate CDAS and use of Coupled system for GDAS						
3110D11001	Develop and test upgarde to the Hurricane Weather Research and Forecasting System	Implement 3km moving nest into operations. Enhanced hurricane track and intensity numerical guidance based on physics and resolution upgrades.	2012-02-15	2012-04-01	2012-04-01	167	-46	-27.54%
3110D11001	Development and testing of the FY12 Real Time Mesoscale Analysis	Improve the "accuracy" and utility of the analysis and analysis uncertainty products produced by the RTMA system. Upgrade to experimental RTMA including improved quality control, improved uncertainty estimate and ability to fit observations closer.	2012-03-01	2012-03-01	2012-03-01	152	0	0.00%
3110D11001	Development and testing of the Short Range Ensemble System upgrade	Upgrade includes:Eliminate 6 Eta and 5 RSM membersAdd 7 NEMS-NMMB, 2 WRF-ARW and 2 WRF-NMM membersUpdate WRF code versionsIncrease horizontal resolution	2012-03-01	2012-03-01	2012-03-01	152	0	0.00%

Key Deliverables								
Project Name	Activity Name	Description	Planned Completion Date	Projected Completion Date	Actual Completion Date	Duration (in days)	Schedule Variance (in days )	Schedule Variance (%)
		to 22 kmBias correct precipitationBias correcting the 21 SREF member forecasts by way of probability matching						
3110D11001	Develop and test Hurricane Wave - Great Lakes - Ensemble upgrades	Replace present wave model physics package with the for upgrade package from the NOPP project. Upgrade bathymetry data from ETOPO2 to ETOPO1. Software unification across all wave model suites. Verification case for CCS Development/Production Environment Equivalence.	2012-03-15	2012-03-15	2012-03-15	121	0	0.00%
3110D11001	Porting code to NOAA R&D Computer Systems	NCEP operational codes will need to be ported to the new NOAA R&D computing systems in Oak Ridge TN and Fairmont WV.	2012-03-30	2012-07-15		181	-154	-85.08%
3110D11001	Development and testing of coupled global forecast system	Development and testing of the coupled global model to determine if solution is applicable to medium range weather prediction.	2012-03-30	2012-03-30	2012-03-30	181	0	0.00%
3110D11001	Development of NOAA modeling infrastructure	The NOAA Environmental Modeling System (NEMS) is being developed and tested to support efficient execution of the operational NCEP	2012-03-30	2012-03-30	2012-03-30	181	0	0.00%

Key Deliverables								
Project Name	Activity Name	Description	Planned Completion Date	Projected Completion Date	Actual Completion Date	Duration (in days)	Schedule Variance (in days )	Schedule Variance (%)
		production suite. Add the capability of moving nests in this task.						
3110D11001	Assessment of the North America Mesoscale System	The FY12 upgrade of the NAM performance will be monitored to identify priority development areas for the FY13 cycle.	2012-03-30	2012-03-30	2012-03-30	181	0	0.00%
3110D11001	Transition Rapid Refresh to NCEP operational production suite	Transition the rapid Refresh system into NCEP operationa	2012-04-01	2012-05-01	2012-05-01	121	-30	-24.79%
3110D11001	Development and testing of the North American Ensemble Forecast System	The North American Ensemble Forecast System is a new weather modeling system run jointly by the Meteorological Service of Canada (MSC) and the U.S. National Weather Service (NWS) to provide numerical weather prediction (NWP) products to weather forecasters in both countries for a forecast period that runs out to 2 weeks in the future. The NAEFS combines the Canadian global forecast model ensemble and the NWS global forecast model ensemble into a joint ensemble that will create weather forecasts for all of North America. At present, all the	2012-04-01	2012-04-01	2012-04-01	169	0	0.00%

Key Deliverables								
Project Name	Activity Name	Description	Planned Completion Date	Projected Completion Date	Actual Completion Date	Duration (in days)	Schedule Variance (in days )	Schedule Variance (%)
		national weather agencies in North America are participating in NAEFS - the Meteorological Service of Canada, the National Meteorological Service of Mexico, and the U.S. National Oceanic and Atmospheric Administration NWS. Upgrades to the system will include the addition of the NAVY FNMOC ensemble system and the addition of downscaled products for CONUS applications.						
3110D11001	Transition the Global Ensemble Forecast System	Transition the GEFS into NCEP operational production suite	2012-05-01	2012-05-01	2012-02-14	106	77	72.64%
3110D11001	Transition the Hurricane Weather Research and Forecasting System	Transition HWRF upgrade into the NCEP operational production suite	2012-05-15	2012-05-15	2012-05-24	89	-9	-10.11%
3110D11001	Transition of FY12 Global Hybrid Data Assimilation System into Operations	Transition the global hybrid data assimilation system into NCEP operational production suite	2012-05-15	2012-05-15	2012-05-22	103	-7	-6.80%
3110D11001	Transition the Short Range Ensemble System	Transition the SREF into the NCEP operational production suite	2012-06-15	2012-06-15		105	-77	-73.33%
3110D11001	Development and testing of the FY13 NAM cycle	Development and testing of the FY13 NAM system in	2012-09-30	2012-09-30		182	0	0.00%

Key Deliverables								
Project Name	Activity Name	Description	Planned Completion Date	Projected Completion Date	Actual Completion Date	Duration (in days)	Schedule Variance (in days )	Schedule Variance (%)
		preparation for the next upgrade cycle.						
3110D11001	Assess HWRF Performance during FY12 Hurricane Season	Performance of the HWRF system will be monitored and assessed during the FY12 hurricane season to identify priority areas for development of the FY13 system	2012-09-30	2012-09-30		137	0	0.00%
3110D11001	Development of the FY13 upgrade for the Real Time Mesoscale Analysis System	Transition the real time mesoscale analysis system into the NCEP operational production suite	2012-09-30	2012-09-30		137	0	0.00%
3110D11001	Development of Semi-Lagrangian advection formulation within global atmospheric model	The Semi-Lagrangian advection formulation will be developed and tested within the GFS system to provide a more computationally efficient code.	2012-09-30	2012-09-30		182	0	0.00%
3110D11001	Development of FY13 Global Data Assimilation System Upgrade	Transition the global hybrid data assimilation system into NCEP operational production suite	2012-09-30	2012-09-30		137	0	0.00%
3110D11001	Development of 2-Way nesting for NOAA Modeling Infrastructure	The 2-way nesting capability for NEMS will be developed and tested for regional hurricane applications	2012-09-30	2012-09-30		182	0	0.00%

## Section C: Operational Data

Table II.C.1 Performance Metrics

Metric Description	Unit of Measure	FEA Performance Measurement Category Mapping	Measurement Condition	Baseline	Target for PY	Actual for PY	Target for CY	Reporting Frequency
Global Forecast System 500mb Anomaly Correlation for the Northern Hemisphere--Difference of 3-month running mean versus the climate data assimilation system	Percentage Points	Customer Results - Service Quality	Over target	10.500000	10.700000	10.700000	11.000000	Semi-Annual
Simulated tropical cyclone day-5 track error for HWRF system in the Atlantic basin.	Nautical Miles	Technology - Quality Assurance	Under target	266.000000	260.000000	257.000000	250.000000	Semi-Annual
12-month running mean quantitative precipitation for the day-2 forecast over the continental US for the North America Model (NAM) system using the 0.25 inch threshold.	Equitable Threat Score	Technology - Quality Assurance	Over target	0.360000	0.361000	0.361000	0.363000	Quarterly
On time delivery of operational numerical guidance products	%	Technology - Reliability and Availability	Over target	99.560000	99.500000	99.690000	99.500000	Monthly
Reliability of operational numerical guidance codes	Number of Code Failures	Mission and Business Results - Support Delivery of Services	Under target	3.000000	3.000000	1.000000	1.000000	Quarterly